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(19) (CA) **CANADIAN PATENT** (12)

(54) Removal of CO<sub>2</sub> and/or H<sub>2</sub>S from Gases

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Abstract of the Disclosure: CO<sub>2</sub> and/or H<sub>2</sub>S are removed from gases containing CO<sub>2</sub> and/or H<sub>2</sub>S by means of an aqueous alkanolamine-containing absorption liquid by a process in which the gas containing CO<sub>2</sub> and/or H<sub>2</sub>S is  
5 treated, in a first absorption stage, at from 40 to 100°C, with an aqueous absorption liquid containing from 20 to 70% by weight of methyldiethanolamine, the gas obtained at the top of the first absorption stage is fed to a second absorption stage in which, to effect further removal of CO<sub>2</sub>  
10 and/or H<sub>2</sub>S, it is treated at from 30 to 90°C with an aqueous absorption liquid which contains from 20 to 70% by weight of methyldiethanolamine and has a lower content of CO<sub>2</sub> and/or H<sub>2</sub>S than the absorption liquid fed into the first absorption stage, the treated gas is taken off at the  
15 top of the second absorption stage, the aqueous absorption liquid obtained at the bottom of the second absorption stage and preladen with CO<sub>2</sub> and/or H<sub>2</sub>S is fed to the top of the first absorption stage, the aqueous absorption liquid obtained in the lower part of the first absorption stage and  
20 laden with CO<sub>2</sub> and/or H<sub>2</sub>S is let down in two or more flash stages in order to regenerate it, the final flash stage being operated under reduced pressure, a stream of absorption liquid obtained at the bottom of the final flash stage is recycled to the first absorption stage, a further stream of  
25 absorption liquid obtained at the bottom of the final and/or penultimate flash stages is fed to a stripping zone for further regeneration, and the regenerated absorption liquid obtained at the bottom of the stripping zone is recycled to the second absorption stage.

1291321

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A process for removing  $\text{CO}_2$  and/or  $\text{H}_2\text{S}$  from a gas containing  $\text{CO}_2$  and/or  $\text{H}_2\text{S}$  by means of an aqueous alkanolamine-containing absorption liquid, said process comprising the steps of:

(a) treating a gas containing  $\text{CO}_2$  and/or  $\text{H}_2\text{S}$ , in a first absorption stage, at from 40 to  $100^\circ\text{C}$ , with an aqueous absorption liquid containing from 20 to 70% by weight of methyldiethanolamine;

(b) feeding the gas obtained at the top of the first absorption stage to a second absorption stage in which, to effect further removal of  $\text{CO}_2$  and/or  $\text{H}_2\text{S}$ , it is treated at from 30 to  $90^\circ\text{C}$  with an aqueous absorption liquid which contains from 20 to 70% by weight of methyldiethanolamine and has a lower content of  $\text{CO}_2$  and/or  $\text{H}_2\text{S}$  than the absorption liquid fed into the first absorption stage;

(c) taking off the treated gas at the top of the second absorption stage;

(d) feeding the aqueous absorption liquid obtained at the bottom of the second absorption stage and preladen with  $\text{CO}_2$  and/or  $\text{H}_2\text{S}$  to the top of the first absorption stage;

(e) letting down the aqueous absorption liquid obtained in the lower part of the first absorption stage and laden with  $\text{CO}_2$  and/or  $\text{H}_2\text{S}$  in two or more flash stages in order to regenerate it, the final flash stage being operated under reduced pressure;

(f) recycling a stream of absorption liquid obtained at the bottom of the final flash stage to the first absorption stage;

(g) feeding a further stream of absorption liquid obtained at the bottom of the final and/or penultimate flash

1291321

stages to a stripping zone for further regeneration; and

(h) recycling the regenerated absorption liquid obtained at the bottom of the stripping zone to the second absorption stage.

2. A process as claimed in claim 1, comprising the additional step of:

(i) feeding an amount of steam corresponding to the water loss to the bottom of the penultimate flash stage in order to compensate for the water losses as a result of water being present in the gas streams taken off at the top of the second absorption stage and/or from the flash stages and/or from the stripping zone.

3. A process as claimed in claim 1, wherein the reduced pressure in the final flash stage is produced by means of a steam ejector.

4. A process as claimed in claim 3, comprising the additional step of:

(j) feeding the gas taken off at the top of the final flash stage, together with the steam used for operating the steam ejector, to the bottom of the penultimate flash stage.



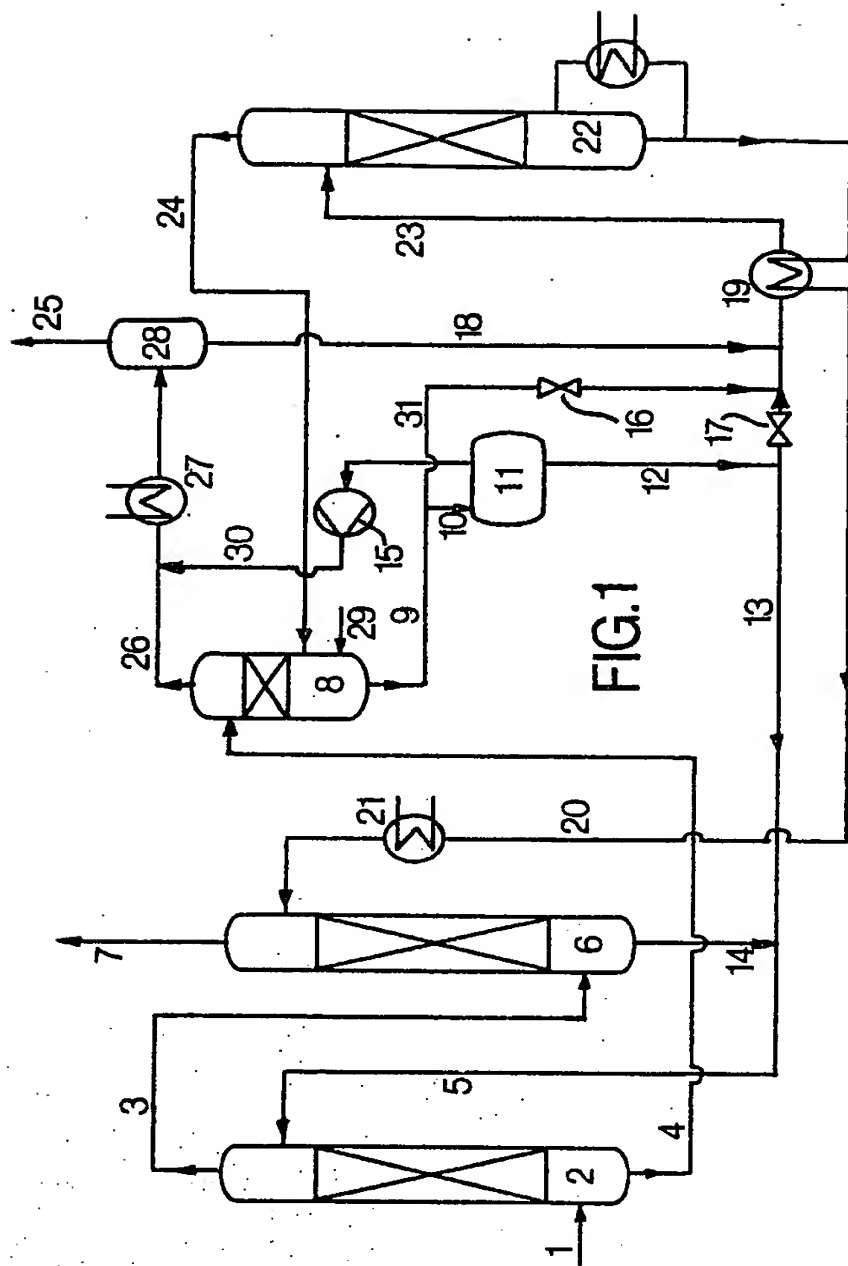
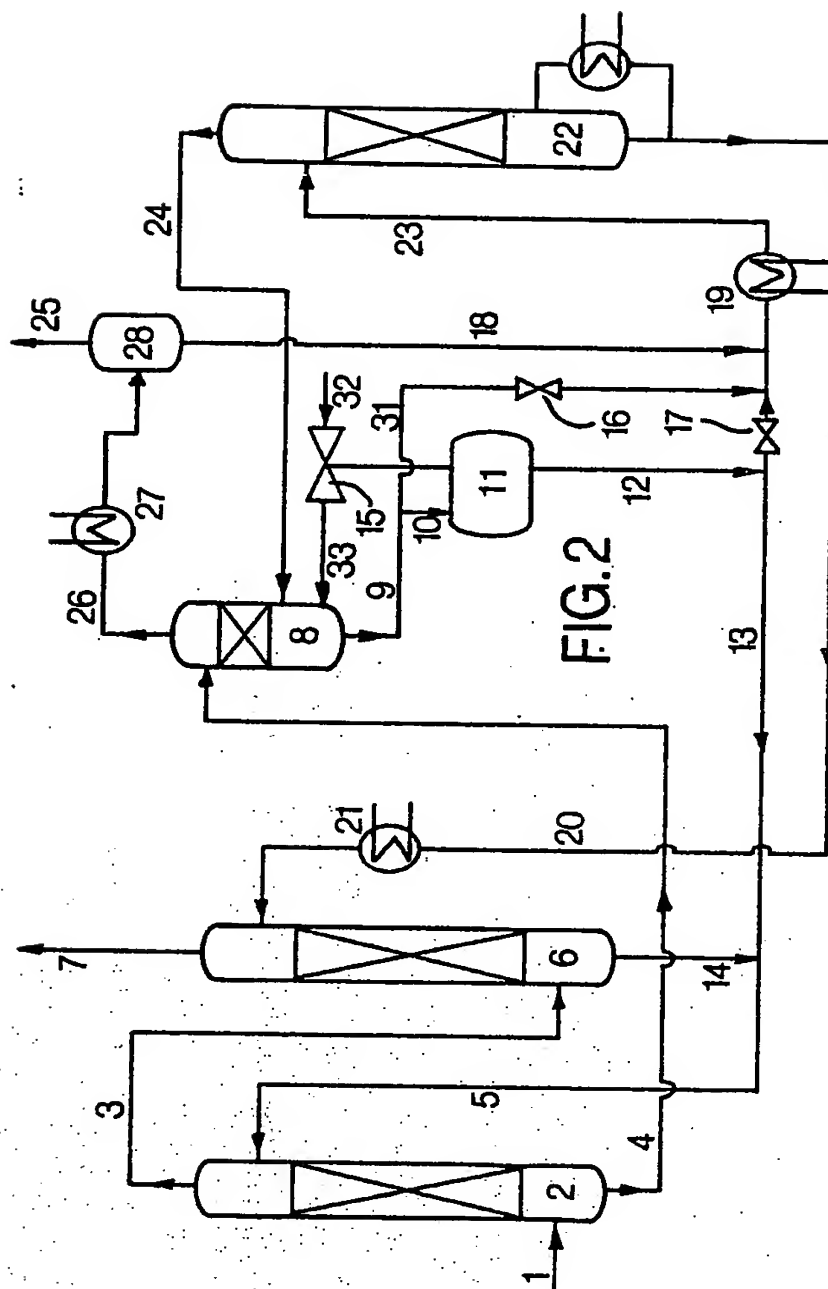


FIG. 1

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